These unsightly hunks of waste tires await further processing into crumb rubber, the particles of which are blended with asphalt paving mixes for use in Caltrans maintenance and construction projects. Caltrans asphalt mixes contained an average of almost 40 percent crumb rubber in 2016.

Retiring the Old Tires
They're Finding New Life in Pavement Mixes; 4.7 Million Used by Caltrans in 2016

Caltrans has again exceeded its state-mandated goal to use more ground-up rubber from old tires in its asphalt paving mixes.

Since 2007, Caltrans has been required by law to use a fixed amount of Crumb Rubber Modifier (CRM) per metric ton of asphalt paving material for projects, where feasible. In 2013, California raised the minimum to 11.58 pounds per metric ton, nearly double the amount required with the law's inception six years earlier — requiring about 35 percent of its total asphalt pavement material to contain CRM.

In 2016, the most recent record available, Caltrans projects using CRM diverted more than 4.7 million waste tires from landfills, tire stockpiles and other methods of disposal that carry potential long-term environmental impacts, according to Caltrans' 2016 Crumb Rubber Report.

That's a 39.8 percent CRM usage mark, exceeding the 35 percent requirement. Caltrans posted a slightly higher CRM usage percentage in 2015, 41.3 percent, but used more asphalt material in its 2016 pavement work that resulted in 100,000 more waste tires being consumed than in 2015, despite the percentage decline of crumb rubber as part of the overall mix in 2016.

Assuming an average tire width of 26 inches, the total tires used for CRM in Caltrans projects that year translated to 122,200,000 inches, or 1,928 miles.

Using an average tire thickness of 8 inches, that's 3,133,333.33 feet, or 593 miles high, enough to place the stack into the earth's exosphere, well past the zone where the International Space Station and satellites circle.

Usage is increasing as Caltrans continues to explore and refine how crumb rubber modifiers can be applied to asphalt pavement mixes.

The Road Repair and Accountability Act of 2017 (Senate Bill 1) also will add to the volume of asphalt pavement, and CRM used, as more highway rehabilitation projects around the state are completed.

The report also analyzed the cost of crumb rubber asphalt vs. conventional asphalts for four different types of pavement projects: preservation (maintenance), rehabilitation, capital preventative maintenance and new/safety/temporary detours.

These cost variances, on a per-metric ton basis, range from 8 to 24 percent more for asphalt incorporating CRM. However, Caltrans' research has shown that asphalt containing crumb rubber better resists reflective cracking than conventional asphalt pavement. This is an especially relevant benefit given the ongoing costs of upkeep from such roadway cracking across the State Highway System. Caltrans will continue to use sound engineering judgment to decide when and where asphalt containing CRM will be used.

Asphalt pavement guidelines in Caltrans' Highway Design Manual were updated in 2017 to allow use of conventional asphalt by exception only. During construction, exceptions to using asphalt containing crumb rubber may be considered because of factors such as the availability of asphalt concrete, constructability, environmental considerations and cost. Exceptions may cover the following situations:

- When CRM project quantities are less than 1,000 metric tons, or stage construction operations require less than 1,000 metric tons per stage.
- When placed as a concrete pavement asphalt base.

> Caltrans' research has shown that asphalt containing crumb rubber better resists reflective cracking than conventional asphalt pavement.

- When the temperature is below 45 degrees Fahrenheit, when crumb rubber hardens and becomes difficult to work with.
- Where the roadway is above 3,000 feet in elevation, where snow chains and truck traffic adversely affect the material's performance.
- When placed as a bond breaker between the asphalt and concrete pavement layers.

Information about additional waste tire applications used by Caltrans is available on the Department's website. M**M**

Source: *2016 Crumb Rubber Report; Jason Probst, Strategic Planning Manager, Caltrans Division of Maintenance*

Percentage of Asphalt Containing Crumb Rubber Modifier (CRM) Used by Caltrans

Legend:
- Asphalt containing Crumb Rubber Modifier
- Goal established by Public Resources Code Section 42703(a)

Data points (Asphalt containing Crumb Rubber Modifier):
2000: 15.6%, 2001: 10.9%, 2002: 5.9%, 2003: 15.7%, 2004: 17.9%, 2005: 34.2%, 2006: 30.4%, 2007: 36.3%, 2008: 29.5%, 2009: 23.6%, 2010: 30.6%, 2011: 34.2%, 2012: 29.2%, 2013: 22.9%, 2014: 26.7%, 2015: 41.3%, 2016: 39.8%

Goal: 2006–2012: 20%→25%, 2013 onward: 35%